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Algebra II Delta & Eta

Quiz 3 Unit III Practice
Radicals and Rational Exponents
February 5, 2015

Name: Mr. Davis

1. Simplify $27^{\frac{2}{3}} = (27^{\frac{1}{3}})^2$
 $= (\sqrt[3]{27})^2$
 $= 3^2$
 $= 9$

2. Simplify $9^{\frac{3}{2}} = (9^{\frac{1}{2}})^3$
 $= (\sqrt{9})^3$
 $= 3^3$
 $= 27$

3. Write $x^{\frac{2}{3}}$ in simplified radical form

$$x^{\frac{2}{3}} = (x^2)^{\frac{1}{3}} = \sqrt[3]{x^2}$$

or

$$x^{\frac{2}{3}} = (x^{\frac{1}{3}})^2 = (\sqrt[3]{x})^2$$

4. Write $x^{\frac{2}{5}}$ in simplified radical form

$$x^{\frac{2}{5}} = (x^2)^{\frac{1}{5}} = \sqrt[5]{x^2}$$

or

$$x^{\frac{2}{5}} = (x^{\frac{1}{5}})^2 = (\sqrt[5]{x})^2$$

5. Write \sqrt{x} in exponential form

$$x^{\frac{1}{2}}$$

6. Write $\sqrt[3]{18y^2}$ in exponential form

$$(18y^2)^{\frac{1}{3}} = 18^{\frac{1}{3}}y^{\frac{2}{3}}$$

7. Simplify $(10x^3)^{\frac{1}{2}} \cdot (20xy)^{\frac{1}{2}}$

$$\begin{aligned} & \sqrt{10x^3} \sqrt{20xy} \quad (\cancel{10x^3} \cancel{20xy}) \\ & \rightarrow \sqrt{10x^3 \cdot 20xy} \\ & \quad \sqrt{200x^4y} \\ & \quad \sqrt{100 \cdot 2x^4y} \\ & \quad 10x^2 \sqrt{2y} \end{aligned}$$

8. Simplify $(27y^6)^{\frac{4}{3}}$

$$\begin{aligned} & 27^{\frac{4}{3}} \cdot y^8 \\ & (27^{\frac{1}{3}})^4 y^8 \\ & 3^4 y^8 \\ & 81y^8 \end{aligned}$$

9. Simplify $5\sqrt{12} + 2\sqrt{27} - 3\sqrt{48}$

$$\begin{aligned} & 5\sqrt{4 \cdot 3} + 2\sqrt{9 \cdot 3} - 3\sqrt{16 \cdot 3} \\ & 5 \cdot 2\sqrt{3} + 2 \cdot 3\sqrt{3} - 3 \cdot 4\sqrt{3} \\ & 10\sqrt{3} + 6\sqrt{3} - 12\sqrt{3} \\ & 4\sqrt{3} \end{aligned}$$

10. Simplify $4x\sqrt[3]{16x} + \sqrt[3]{54x^4}$

$$\begin{aligned} & 4x\sqrt[3]{8 \cdot 2x} + \sqrt[3]{27 \cdot 2x^3 \cdot x} \\ & 4 \cdot 2x\sqrt[3]{2x} + 3x\sqrt[3]{2x} \\ & 8x\sqrt[3]{2x} + 3x\sqrt[3]{2x} \\ & 11x\sqrt[3]{2x} \end{aligned}$$

11. Solve $\sqrt{2x} = 8$

$$\begin{aligned} 64 &= 2x \\ 32 &= x \end{aligned}$$

12. Solve $\sqrt{3x+7} - 2 = 3$

$$\begin{aligned} \sqrt{3x+7} &= 5 \\ 3x+7 &= 25 \\ 3x &= 18 \\ x &= 6 \end{aligned}$$